Small Business Innovation Research/Small Business Tech Transfer

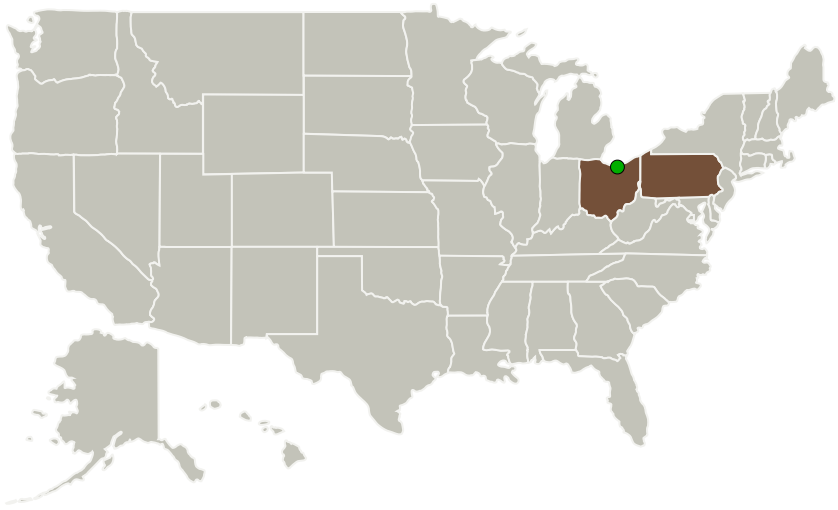
Large Area Diamond Tribological Surfaces with Negligible Wear in Extreme Environments, Phase I

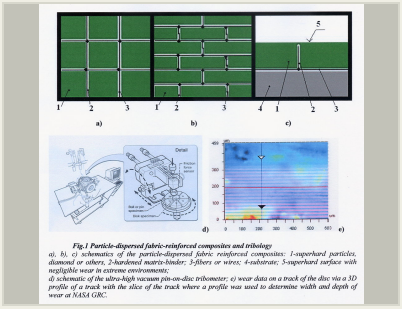
Completed Technology Project (2017 - 2017)

Project Introduction

In Phase I we propose to demonstrate the processing of very large area diamond sliding bearings and tribological surfaces. The bearings and surfaces will experience negligible wear and long life in extreme environments, such as encountered in high temperature exploration of Venus. Low temperature bearings that survive conditions encountered in Mars, Moon, Titan, Europe and Ganymede will be also considered. A pressure-assisted fabrication procedure will be developed to produce particle-dispersed and fabric-reinforced composite bearings and coatings. Diamond composite surfaces will consist of crystallites that are toughened with oriented fibers. Long-life diamond composites will be achieved at low cost. In Phase I, we will compare wear and friction properties of sliding interfaces and optimize bearing performance. In Phase II, we will collaborate with a manufacturing company to scale the new processing technology, and with a bearing manufacturer to fabricate prototype bearings for performance testing in extreme environments.

Primary U.S. Work Locations and Key Partners





Large Area Diamond Tribological Surfaces with Negligible Wear in Extreme Environments, Phase I Briefing Chart Image

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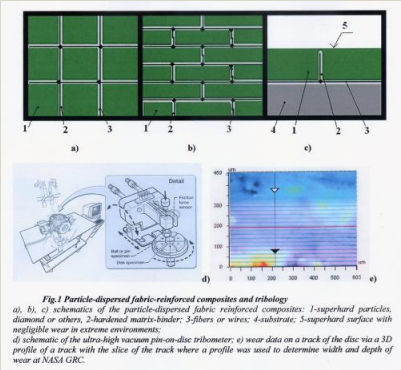
Organizations Performing Work	Role	Type	Location
Diamond Materials, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	East Stroudsburg, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Pennsylvania

Images



Briefing Chart Image
Large Area Diamond Tribological Surfaces with Negligible Wear in Extreme Environments, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/131026)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Diamond Materials, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

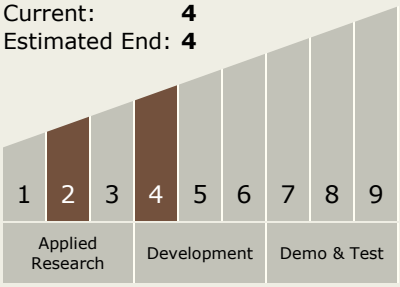
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Oleg A Voronov

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.2 Flight Mechanics
    - TX15.2.1 Trajectory Design and Analysis